

Regurgitation due to megaesophagus in a ram

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Regurgitation can be defined as the emptying of food from the esophagus through the mouth or nostrils after it has been swallowed but before it has reached the forestomachs. Regurgitated feed is mixed with saliva, not thoroughly chewed, and therefore appears green with most ovine diets. This differs from vomited feed which appears pulpy, fluid, and considerably chewed and has the odor and color of rumen content.

Since we are not aware of any case report on regurgitation in sheep, we describe herein a 12-month-old White Alpine ram showing regurgitation due to megaesophagus. The ram belonged to a flock with six ewes. The animals were kept at pasture and were fed additional hay, a few turnips, concentrates, and mineral supplements. The ram had been purchased by the present owner four months before admission to the clinic. Since the purchase, the owner had observed that the animal "vomited" feed, that it suffered occasionally from mild bloat, and, additionally, had intermittent brown nasal discharge. The referring practitioner treated the ram unsuccessfully with neostigmine and several stomachic drugs containing tanning agents and bitter constituents of plant origin to stimulate digestion. Because the animal was a promising breeding ram, it was admitted to our clinic for diagnostic purposes.

The animal was in a good nutritional state and well-groomed. Vital signs and other body systems were normal. Both nostrils were soiled by dark, dried discharge due to frequent regurgitation through them. Examination of rumen fluid indicated moderate inactivation of forestomach flora and fauna. The parasitological examination of feces revealed a few oocysts of coccidia and a few strongyles eggs.

Endoscopy of the nose, pharynx, and esophagus using a bronchoscope (Olympus BF, type P 10, Olympus Optical AG, CH-8702 Zollikon, Switzerland) revealed feed particles both in the ventral nasal meatus and in the pharynx. The esophagus appeared normal in the cranial region (about 20 cm). The caudal region was difficult to evaluate but it seemed to be dilated. No stricture, stenosis, or foreign body could be found.

Lateral radiographs of the cervical and thoracic esophagus (taken in lateral recumbency after the administration of 50 mL of a barium sulphate suspension by esophageal tube) showed that the esophagus was markedly dilated in the thoracic area and contained a mixture of barium, feed, and gas (Figure 1).

In spite of the poor prognosis, treatment was attempted. The animal received 7.5 mg metoclopramid (Paspertin, Kali-Chemie, CH-3027 Bern, Switzerland) IM for four days at eight hour intervals. Since there were no signs of recovery, the animal was euthanized six days after starting treatment. Necropsy was then performed and all internal organs examined. Additionally, thymus, lung, brain, and esophagus were examined histologically and the esophagus by electron microscopy.

On postmortem examination the esophagus was flaccid. In the cervical area it was slightly dilated and in the thoracic area severely so, to about three times its normal size. Histologically, there was severe infestation with *Sarcocystis* sp. and subacute to chronic degeneration of muscle fibers with inflammation and eosinophils as well as mild fibrosis of the muscular coat (Figure 2). On electron microscopy, there were cysts that were identified as *Sarcocystis arieticanis* (1,2). The cysts were 250 μ m long and 80 μ m wide. Their thin walls (about 2 μ m) had fine, bent appendages, up to 4 μ m long. The cysts contained mainly merozoites and a few metrocytes at the margins. There were no abnormal findings in other organs.

The clinical, endoscopic, radiographic, and postmortem examinations led to a diagnosis of megaesophagus. This disease can be either congenital or acquired. In cattle, megaesophagus occurs due to obstruction of the lumen, compression from outside, or changes to the esophageal wall. Causes are chronic partial obstruction of the esophagus with feed (3) or foreign bodies (4), periesophageal masses such as abscesses, hematomas, and lymphoid tumors (4,5), ulcerative changes of the mucous membrane (4), and hiatus hernias (6). In dogs, the occurrence of megaesophagus is mainly idiopathic, but it also occurs secondary to systemic diseases such as myasthenia gravis, systemic lupus erythematosus, polymyositis, polyneuropathies, insufficiency of the adrenal cortex, distemper, and with prolonged use of cholinesterase inhibitors. Megaesophagus due to myoneural impairment is a well-known disease in man and the dog, whereas in cattle there are only two reports (7,8). In small ruminants, only one case of esophageal dilation has been described; it occurred in a goat (9).

In our patient, we could not find a stenosis due to compression, a stricture, or any obstacle in the esophageal lumen. Therefore a myoneural disturbance was the suspected cause of the esophageal dilation. The severe signs of inflammation caused by the infestation with sarcosporidia may have been responsible for this disturbance. This is supported by the experiments of Heydorn (1) wherein in four out of five sheep 105 days after artificial infection with *Sarcocystis arieticanis*, severe myositis occurred with infiltration of lymphocytes and histiocytes in skeletal musculature, and less pronounced myositis in the musculature of the esophagus

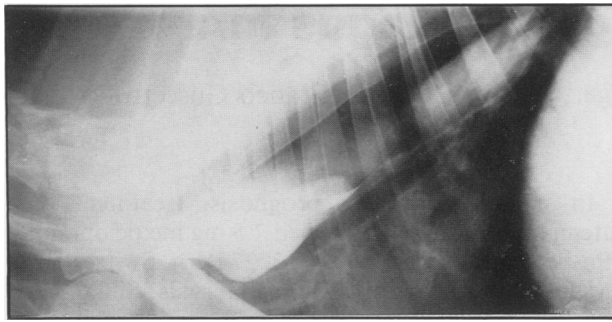


Figure 1. Radiograph: The esophagus is dilated in the thoracic area, and contains barium and gas.

and the tongue. Other authors have also found that infections with *Sarcocystis* species may cause myopathy in sheep (10). On the other hand, in view of the high prevalence of this parasite in apparently normal animals, one must be very cautious about attributing the megaesophagus seen in our ram to the presence of *Sarcocystis* cysts. The examination of 500 slaughterhouse sheep of various ages from Bavaria revealed an 85% infection rate (11). Sarcosporidia were found in esophaguses of more than half the sheep. In a similar study in the United States (2) sarcocysts were found in 48% of 478 esophaguses.

A myoneural disturbance was the suspected cause of the esophageal dilation

The ram in this report suffered from severe inflammation of the esophageal musculature. It is possible that the afferent innervation was thereby impaired. It is also possible that the striated muscles had lost their contractility due to the severe inflammation.

The predominant sign of esophageal dilation is regurgitation of feed. The animal suddenly stops eating and, with head and neck extended, coughs up the food bolus. In cases of megaesophagus, eructation is usually also affected and this explains why bloat was observed in our patient. In most cases, animals have mucous nasal discharge, cough, and often secondary aspiration pneumonia. The tentative diagnosis is made based

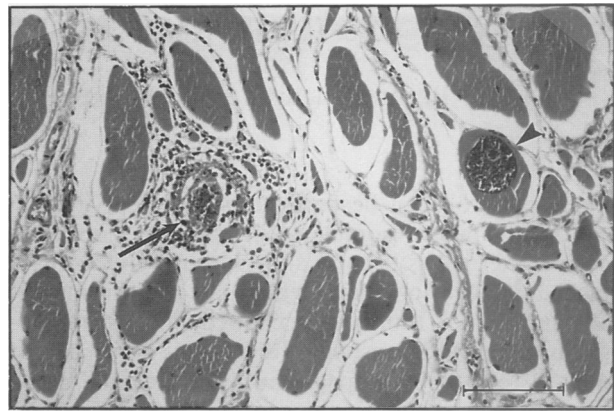


Figure 2. Histological section of the esophageal musculature. Hematoxylin and eosin. Severe infestation with thin-walled cysts of sarcosporidia in the striated muscle fibers (➤), degenerating cyst with inflammation (➡), moderate fibrosis between muscle fibers. Bar = 100 µm.

on clinical signs and confirmed by radiography, possibly by means of a contrast study. CVJ

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